
Document Update Notification

COPYHOLDER NO: 103

TO: ANO-NRC (EMERGENCY RESPONSE
COORD.) - WASHINGTON

ADDRESS: OS-DOC CNTRL DESK MAIL STOP OP1-
17 WASHINGTON DC 20555-DC

DOCUMENT NO: OP-1905.003

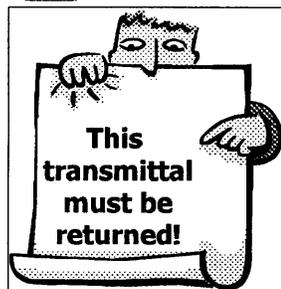
TITLE: RAD PROTECTION REQUIREMENTS FOR
POST-ACCIDENT SAMPING OF RC

REVISION NO: 008-01-0

CHANGE NO: PC-01

SUBJECT: PERMANENT CHANGE (PC)

← *If this box is checked, please sign, date, and return within 5 days.*



ANO-1 Docket 50-313

ANO-2 Docket 50-368

Signature

Date

SIGNATURE CONFIRMS UPDATE HAS BEEN MADE

RETURN TO:

**ATTN: DOCUMENT CONTROL
ARKANSAS NUCLEAR ONE
1448 SR 333
RUSSELLVILLE, AR 72801**

AD45

**ENTERGY OPERATIONS INCORPORATED
ARKANSAS NUCLEAR ONE**

TITLE: Rad Protection Requirements for Post Accident
Sampling of RC

DOCUMENT NO.
1905.003

CHANGE NO.
008-01-0

SET # **103**

WORK PLAN EXP. DATE
N/A

TC EXP. DATE
N/A

SAFETY-RELATED
 YES NO

IPTE
 YES NO

TEMP ALT
 YES NO

When you see these TRAPS

Get these TOOLS

- Time Pressure
- Distraction/Interruption
- Multiple Tasks
- Overconfidence
- Vague or Interpretive Guidance
- First Shift/Last Shift
- Peer Pressure
- Change/Off Normal
- Physical Environment
- Mental Stress (Home or Work)

- Effective Communication
- Questioning Attitude
- Placekeeping
- Self Check
- Peer Check
- Knowledge
- Procedures
- Job Briefing
- Coaching
- Turnover

VERIFIED BY	DATE	TIME
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

FORM TITLE:

VERIFICATION COVER SHEET

FORM NO.
1000.006A

CHANGE NO.
050-00-0

**ENTERGY OPERATIONS INCORPORATED
ARKANSAS NUCLEAR ONE**

**TITLE: RAD PROTECTION REQUIREMENTS FOR POST ACCIDENT
SAMPLING OF RC**

**DOCUMENT NO.
1905.003**

**CHANGE NO.
008-01-0**

AFFECTED UNIT:
 UNIT 1 UNIT 2 PROCEDURE ELECTRONIC DOCUMENT
 WORK PLAN, EXP. DATE **SAFETY-RELATED**
 YES NO

TYPE OF CHANGE:
 NEW PC TC DELETION
 REVISION EZ **EXP. DATE:** _____

- DOES THIS DOCUMENT:**
- Supersede or replace another procedure? (If YES, complete 1000.006B for deleted procedure.) (OCAN058107) YES NO
 - Alter or delete an existing regulatory commitment? (If YES, coordinate with Licensing before implementing.) (OCNA128509)(OCAN049803) YES NO
 - Require a 50.59 review per LI-1017? (See also 1000.006, Attachment 15) (If 50.59 evaluation, OSRC review required.) YES NO
 - Cause the MTCL to be untrue? (See Step 8.5 for details.) (If YES, complete 1000.009A) (1CAN108904, OCAN099001, OCNA128509, OCAN049803) YES NO
 - Create an Intent Change? (If YES, Standard Approval Process required.) YES NO
 - Implement or change IPTE requirements? (If YES, complete 1000.143A. OSRC review required.) YES NO
 - Implement or change a Temporary Alteration? (If YES, then OSRC review required.) YES NO

Was the Master Electronic File used as the source document? YES NO

INTERIM APPROVAL PROCESS		STANDARD APPROVAL PROCESS		
ORIGINATOR SIGNATURE: (Includes review of Att. 13) DATE: <i>Ron Schwartz</i> <i>6/13/02</i>	ORIGINATOR SIGNATURE: (Includes review of Att. 13) DATE: <i>Ron Schwartz</i> <i>6/13/02</i>	ORIGINATOR SIGNATURE: (Includes review of Att. 13) DATE: <i>Ron Schwartz</i> <i>6/13/02</i>	ORIGINATOR SIGNATURE: (Includes review of Att. 13) DATE: <i>Ron Schwartz</i> <i>6/13/02</i>	
Print and Sign name: _____ PHONE #: _____	Print and Sign name: Ron Schwartz PHONE #: 7992	Print and Sign name: Ron Schwartz PHONE #: 7992	Print and Sign name: Ron Schwartz PHONE #: 7992	
SUPERVISOR APPROVAL: * <i>N/A</i>	DATE: _____	INDEPENDENT REVIEWER: <i>Thomas P. Premik</i> <i>6/18/2002</i>	DATE: _____	
SRO UNIT ONE **: <i>N/A</i>	DATE: _____	ENGINEERING: <i>N/A</i>	DATE: _____	
SRO UNIT TWO **: <i>N/A</i>	DATE: _____	QUALITY: <i>N/A</i>	DATE: _____	
Interim approval allowed for non-intent changes requiring no 50.59 evaluation that are stopping work in progress. Standard Approval required for intent changes or changes requiring a 50.59 evaluation. *If change not required to support work in progress, Department Head must sign. **If both units are affected by change, both SRO signatures are required. (SRO signature required for safety related procedures only.)	UNIT SURVEILLANCE COORDINATOR (OCNA049803): DATE: <i>N/A</i>	UNIT SURVEILLANCE COORDINATOR (OCNA049803): DATE: <i>N/A</i>	UNIT SURVEILLANCE COORDINATOR (OCNA049803): DATE: <i>N/A</i>	
	SECTION LEADER: <i>R. Tull</i> <i>6-18-02</i>	SECTION LEADER: <i>R. Tull</i> <i>6-18-02</i>	SECTION LEADER: <i>R. Tull</i> <i>6-18-02</i>	SECTION LEADER: <i>R. Tull</i> <i>6-18-02</i>
	QUALITY ASSURANCE: _____	QUALITY ASSURANCE: _____	QUALITY ASSURANCE: _____	QUALITY ASSURANCE: _____
	OTHER SECTION LEADERS: _____	OTHER SECTION LEADERS: _____	OTHER SECTION LEADERS: _____	OTHER SECTION LEADERS: _____
	OTHER SECTION LEADERS: _____	OTHER SECTION LEADERS: _____	OTHER SECTION LEADERS: _____	OTHER SECTION LEADERS: _____
OSRC CHAIRMAN/TECHNICAL REVIEWER: (OCNA049312) DATE: <i>Diane White</i> <i>6-18-02</i>	OSRC CHAIRMAN/TECHNICAL REVIEWER: (OCNA049312) DATE: <i>Diane White</i> <i>6-18-02</i>	OSRC CHAIRMAN/TECHNICAL REVIEWER: (OCNA049312) DATE: <i>Diane White</i> <i>6-18-02</i>	OSRC CHAIRMAN/TECHNICAL REVIEWER: (OCNA049312) DATE: <i>Diane White</i> <i>6-18-02</i>	
FINAL APPROVAL: _____ Date: _____	FINAL APPROVAL: _____ Date: _____	FINAL APPROVAL: _____ Date: _____	FINAL APPROVAL: _____ Date: _____	
REQUIRED EFFECTIVE DATE: <i>08 July 2002 ITS Implementation</i>	REQUIRED EFFECTIVE DATE: _____	REQUIRED EFFECTIVE DATE: _____	REQUIRED EFFECTIVE DATE: _____	

FORM TITLE: PROCEDURE/WORK PLAN APPROVAL REQUEST **FORM NO. 1000.006B** **CHANGE NO. 051-00-0**

**ENTERGY OPERATIONS INCORPORATED
ARKANSAS NUCLEAR ONE**

TITLE: Rad Protection Requirements for Post Accident
Sampling of RC

DOCUMENT NO.
1905.003

CHANGE NO.
008-01-0

PROCEDURE

WORK PLAN, EXP. DATE _____

PAGE 1 **OF** _____

ELECTRONIC DOCUMENT

TYPE OF CHANGE:

NEW

PC

TC

DELETION

REVISION

EZ

EXP. DATE: _____

AFFECTED SECTION:
(Include step # if applicable)

DESCRIPTION OF CHANGE: (For each change made, include sufficient detail to describe reason for the change.)

3.1.6

Corrected reference to procedure "High Activity in RCS" – procedure name reference is correct but the number reference was incorrect – "2203.001" changed to "2203.020"

3.1.8

Added ITS reference for ANO-1 TS 5.5.3

3.2.4

Corrected reference to procedure "High Activity in RCS" – procedure name reference is correct but the number reference was incorrect – "2203.001" changed to "2203.020"

N/A

These changes do not require a 50.59 Review because:

- Changes Correcting references to procedure titles, numbers, sections or steps of another procedure do not require a 50.59 review (OP-1000.006, Attachment 15, Item 5)
- Changes adding references in the reference section or in the body of the procedure do not require a 50.59 Review (OP-1000.006, Attachment 15, Item 10)

FORM TITLE:

DESCRIPTION OF CHANGE

FORM NO.
1000.006C

CHANGE NO.
050-00-0

PROC./WORK PLAN NO. 1905.003	PROCEDURE/WORK PLAN TITLE: RAD PROTECTION REQUIREMENTS FOR POST-ACCIDENT SAMPLING OF RC	PAGE: 1 of 7 CHANGE: 008-01-0
---	--	--

1.0 PURPOSE

The purpose of this procedure is to specify radiological protection requirements to be followed when obtaining a post-accident reactor coolant liquid sample.

2.0 SCOPE

This procedure applies to post accident sampling of the Unit One and Unit Two reactor coolant system with less than or equal to 5% clad failure for the determination of failed fuel for emergency classification determination. This procedure also applies to sampling of the reactor coolant system, containment sump and containment air during any failed fuel level to determine the extent of the reactor core damage.

3.0 REFERENCES

3.1 REFERENCES USED IN DEVELOPING THIS PROCEDURE:

- 3.1.1 ANO Emergency Plan
- 3.1.2 ANO's EAL Bases Document
- 3.1.3 1607.001, "Reactor Coolant System Sampling"
- 3.1.4 2607.001, "Unit 2 Reactor Coolant System Sampling"
- 3.1.5 1203.019, "High Activity in Reactor Coolant"
- 3.1.6 2203.020, "High Activity in RCS"
- 3.1.7 LIR L00-0005, Dose Assessment for RCS sampling during Fuel Cladding failure.
- 3.1.8 ANO-1 Technical Specifications, 5.5.3 "Post Accident Sampling"

3.2 REFERENCES USED IN CONJUNCTION WITH THIS PROCEDURE:

- 3.2.1 1607.001, "Reactor Coolant System Sampling"
- 3.2.2 2607.001, "Unit 2 Reactor Coolant System Sampling"
- 3.2.3 1203.019, "High Activity in Reactor Coolant"
- 3.2.4 2203.020, "High Activity in RCS"
- 3.2.5 1903.033, "Protective Action Guidelines for Rescue/Repair & Damage Control Teams"

3.3 RELATED ANO PROCEDURES:

- 3.3.1 1903.033, "Protective Action Guidelines for Rescue/Repair & Damage Control Teams"

PROC./WORK PLAN NO. 1905.003	PROCEDURE/WORK PLAN TITLE: RAD PROTECTION REQUIREMENTS FOR POST-ACCIDENT SAMPLING OF RC	PAGE: 2 of 7 CHANGE: 008-01-0
---	--	--

3.4 REFERENCE TO NRC COMMITMENTS:

- 3.4.1 0CNA08005 (P-16724), Develop, implement, and maintain the capability for classifying fuel damage events at the Alert level threshold. This capability may utilize the normal sampling system or correlate normal sample system dose rates to coolant concentrations. Section 5.1.
- 3.4.2 0CNA08005 (P-16725), Develop, implement, and maintain contingency plans for obtaining and analyzing highly radioactive samples of reactor coolant, the containment sump, and containment atmosphere. The contingency plans do not have to be demonstrated. Because these are contingency plans, the staff concludes that, in accordance with 10 CFR 50.47 and Appendix E to 10 CFR Part 50 for emergency plans, these contingency plans must be available to be used by the licensee during an accident; however, these contingency plans do not have to be carried out in emergency plan drills or exercises. Complete procedure

4.0 RESPONSIBILITY AND AUTHORITY

- 4.1 The Manager, Radiation Protection is responsible for the overall control and implementation of this procedure.
- 4.2 The Radiation Protection Supervisors are responsible for directing the Health Physics Technicians that carry out the provisions of this procedure.

5.0 INSTRUCTIONS

NOTE

For the purpose of this procedure, post accident sampling conditions exist when plant indications show or there is reason to believe that Reactor Coolant System I-131 activity is equal to or exceeds 10 uCi/gm.

[5.1 Post Accident Sampling For Emergency Action Level Classification]

CAUTION

Post accident sampling for ≤5% clad failure will be performed via the normal sampling system. Due to elevated activities in the RCS, samples returned to the auxiliary building sump may cause airborne conditions in the auxiliary building. Also, an increase in radioactive effluents from the plant may occur during this evolution.

- 5.1.1 Chemistry will align the normal sampling system in accordance with procedure 1607.001 or 2607.001 for the affected unit, Unit 1 or Unit 2, respectively.
- 5.1.2 Continuous Radiation Protection coverage is required during recirculation and sampling.
- 5.1.3 **WHEN** the required flush time is complete,
THEN Radiation Protection shall perform the following:

PROC./WORK PLAN NO. 1905.003	PROCEDURE/WORK PLAN TITLE: RAD PROTECTION REQUIREMENTS FOR POST-ACCIDENT SAMPLING OF RC	PAGE: 3 of 7 CHANGE: 008-01-0
---	--	--

- A. Determine the dose rate at 12 inches (30 cm) from the designated reactor coolant system sample pipe. See Attachment 2.
 - 1. Unit One - SA-229, located overhead in the hallway on the south wall, elevation 354' (Attachment 2, Figure 1).
 - 2. Unit Two - 2TCD-19, located inside door 230, overhead in the hallway room 2065, elevation 354' (Attachment 2, Figure 2).

- 5.1.4 Report the dose reading to the affected Control Room. The Control Room will determine and report the degree of clad failure to Chemistry personnel.
- 5.1.5 **IF** the dose rate indicates >5% clad failure, or operations does not request RCS sampling.
THEN go to step 5.1.11.
- 5.1.6 **IF** the dose rate indicates ≤5% clad failure and operations request an RCS sample,
THEN go to step 5.1.7.
- 5.1.7 Ensure primary sample hood ventilation is operable and in use during post accident sampling if applicable.
- 5.1.8 Determine radiological protection requirements for sampling activities using the expected radiological conditions given in Attachment 1:
 - A. Electronic dosimeter alarm set points:
dose rate - 6500 mrem/hr, dose - 100 mrem
 - B. Air Sampling
 - C. Respiratory protection
 - D. Anti-contamination protection
 - E. Multiple dosimetry
 - F. Use of shielding
- 5.1.9 Brief Chemistry personnel on the expected radiological conditions and associated controls prior to performing sampling activities.
- 5.1.10 Allow Chemistry to perform sampling in accordance with the appropriate procedure.

PROC./WORK PLAN NO. 1905.003	PROCEDURE/WORK PLAN TITLE: RAD PROTECTION REQUIREMENTS FOR POST-ACCIDENT SAMPLING OF RC	PAGE: 4 of 7 CHANGE: 008-01-0
---	--	--

5.1.11 Request Chemistry to secure from sampling.

- A. Sample lines should be flushed, if possible, to reduce radiation levels.
- B. Perform post-sampling radiological surveys to confirm area conditions.

5.2 Post-Accident Sampling

WARNING

Worst case accident of 100 percent failed fuel would result in an anticipated specific activity of ten curies per milliliter of reactor coolant.

Post-accident sampling may be performed in the primary sample room or other areas of the plant using normal or evaluated sample points. Normally this type of sampling will not be performed in the early phase of an accident, but would rather be performed days or even months after the event.

Following is a list of actions that must be taken and/or considered prior to obtaining and analyzing any sample.

- 5.2.1 Perform a pre-job briefing in accordance with procedure 1903.033, "Protective Action Guidelines for Rescue/Repair and Damage Control Teams".
- 5.2.2 Radiological Considerations
 - A. Continuous Radiation Protection coverage is required during any re-circulation and sampling.
 - B. Upon establishment of recirculation or sample flow, Radiation Protection will monitor doserates.
 - C. Determine radiological protection requirements based upon expected conditions to address the following:
 - Electronic dosimeter alarm set points
 - Air Sampling
 - Respiratory protection
 - Anti-contamination protection
 - Multiple dosimetry
 - Use of shielding

PROC./WORK PLAN NO. 1905.003	PROCEDURE/WORK PLAN TITLE: RAD PROTECTION REQUIREMENTS FOR POST-ACCIDENT SAMPLING OF RC	PAGE: 5 of 7 CHANGE: 008-01-0
---	--	--

- D. Consider Self-Contained Breathing Apparatus (SCBA) respiratory protection to be worn by Nuclear Chemists and Health Physics technicians when taking and analyzing samples.

5.2.3 Ventilation Considerations

- A. Consider ventilation needs during sampling.
- B. Ensure sample hoods are in service (if applicable).
- C. Ensure Auxiliary Building ventilation and monitoring system is operable and in service.

5.2.4 Sample Considerations

- A. Pre-determine storage and disposal sites of used and unused portions of the sample.
- B. Consider returning sample to the containment building if possible.
- C. Stationary lead glass shielding is to be used as appropriate
- D. Transfer sample immediately to the sample pig and secure lid.
- E. Perform sample preparations in the sample hood.

5.2.5 Chemistry will perform sampling and analysis using normal procedures for line-up and analysis or evaluated sampling along with the precautions developed in the previous steps.

6.0 ATTACHMENTS AND FORMS

6.1 ATTACHMENTS

- 6.1.1 Attachment 1 - "Estimated Radiation Levels for 5% Fuel Cladding Failure".
- 6.1.2 Attachment 2 - "Survey Points"

6.2 FORMS

None

PROC./WORK PLAN NO. 1905.003	PROCEDURE/WORK PLAN TITLE: RAD PROTECTION REQUIREMENTS FOR POST-ACCIDENT SAMPLING OF RC	PAGE: 6 of 7 CHANGE: 008-01-0
--	---	--

ATTACHMENT 1

Estimated Radiation Levels for 5% Fuel Cladding Failure

Assumptions:

- Fuel cladding failure does not exceed 5%.
- Source term consists of iodine and noble gas isotopes.
- Source term specific activity at 0.5 hours post accident is approximately 8.35+03 µCi/ml (Unit 1) and 1.24E+04 µCi/ml (Unit 2).
- Individual performing sampling will maintain whole body approximately 1.5 feet from sample and extremities approximately 0.25 feet from sample when drawing sample, and will maintain whole body approximately 2 feet from sample and extremities approximately 1 foot from sample when analyzing sample.
- Sample times: collect sample, 0.5 min., analyze sample 3.0 min.

Radiation levels

Dose rates (mrem/hr) at the primary sample hood(s) as given in LIR L00-0005 for the body locations given above:

	SDE-ME (mrem/hr)	DDE (mrem/hr)	SDE-WB (mrem/hr)
Unit 1 (5%CF)	14669	5751	6049
Unit 2 (5%CF)	17593	6438	6595

Estimated doses to collect sample:

Unit 1

DDE	0.5 min. x	5751 mrem/hr.	=	48 mrem
SDE-ME	0.5 min. x	14669 mrem/hr.	=	122 mrem
SDE-WB	0.5 min x	6049 mrem/hr.	=	50 mrem

Unit 2

DDE	0.5 min. x	6438 mrem/hr.	=	54 mrem
SDE-ME	0.5 min. x	17593 mrem/hr.	=	147 mrem
SDE-WB	0.5 min x	6595 mrem/hr.	=	55 mrem

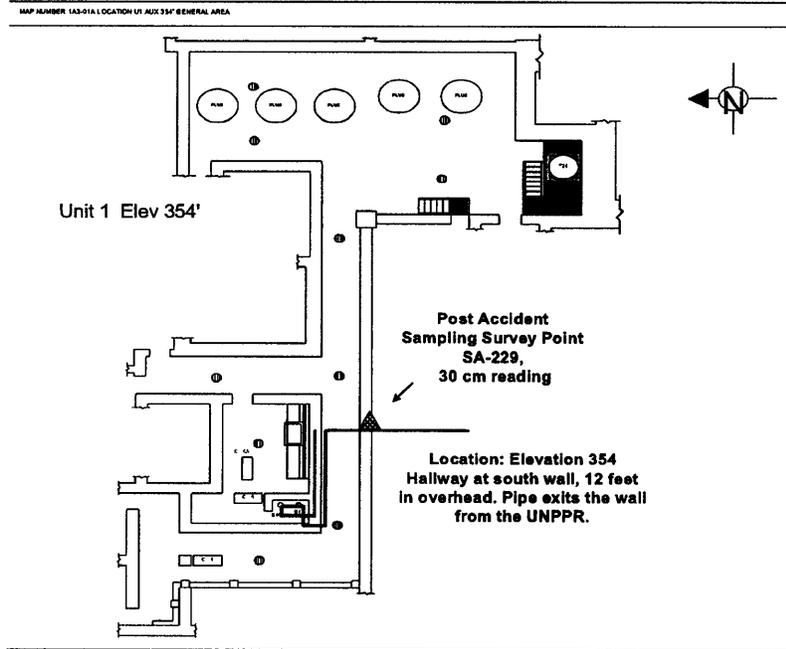
Estimated contact dose rate for 1:1000 dilution of maximum 5% clad failure sample:

Unit 1 - 73 mrem/hr Unit 2 - 100 mrem/hr

PROC./WORK PLAN NO. 1905.003	PROCEDURE/WORK PLAN TITLE: RAD PROTECTION REQUIREMENTS FOR POST-ACCIDENT SAMPLING OF RC	PAGE: 7 of 7 CHANGE: 008-00-0
---	--	--

ATTACHMENT 2

Survey Points



Survey Point, 30 cm - ►

Figure 1 - Unit 1 Elev. 354 Survey Point

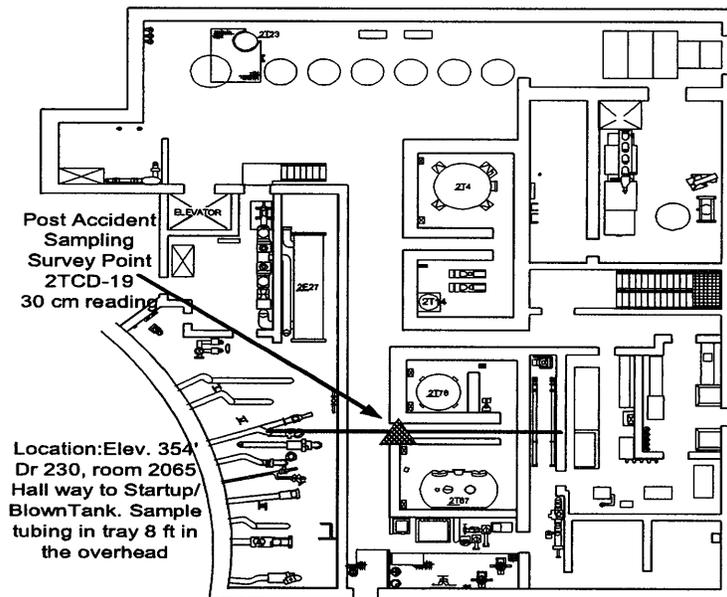


Figure 2 - Unit 2, Elev. 354 Survey Point